

Using Manipulatives to Investigate ESOL Students' Achievement and Dispositions in Algebra.

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DOCTOR OF EDUCATION IN TEAC

Using Manipulatives to Investigat Students' Achievement and Disp Algebra

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Doctor of Education in Teacher Leadership (Ed.D)

Department

Educational Leadership

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Dr. Kimberly Gardner

First Committee Member

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Second Committee Member

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Abstract

The purpose of this embedded quasi-experimental mixed to investigate the effectiveness of concrete and virtual ma achievement of English Speakers of Other Languages (ESOL) to explore linear and exponential functions in high school Coordinate Algebra. Also of interest were the effects concrete manipulatives have on their disposition towards mathematics. Another goal was to investigate the benefits and disadvantages of virtual manipulatives versus traditional instructional practices.

This was a 5-week study. The control group (N=20) was instructed using mathematics textbooks and Power Points (traditional) and the treatment group (N=19), which was instructed using concrete manipulatives. One ESOL mathematics teacher implemented both groups by utilizing the sheltered instruction observation model (2012) model to integrate content and language.

Qualitative research methods, teacher interviews, recorded work samples and artifacts were utilized. Quantitative data were used to analyze departmentalized Linear and Exponential Summative Assessments (pretest and posttest) to measure achievement. The one-way ANOVA uncovered no significant difference between the control group and treatment group as they explored exponential functions. The Quantitative Understanding: An Achievement and Reasoning Students Disposition instrument (pre- and post-questionnaire) measured dispositions about mathematics class. The one-way ANOVA indicated no statistically significant difference between the control and the treatment group's dispositions about mathematics class.

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